

## ANNEX A

### SUMMARY OF TROPICAL CYCLONES IN THE CENTRAL NORTH PACIFIC

#### 1. GENERAL RESUME

Fleet Weather Central, Pearl Harbor, issued warnings on two tropical cyclones in 1973 for the Central Pacific as shown in Table A-1. Warnings were coordinated with the Central Pacific Hurricane Center, Honolulu, and the Eastern Pacific Hurricane Center, San Francisco, in accordance with the National Hurricane Operations Plan.

TABLE A-1. COMPARISON OF CENTRAL PACIFIC ANNUAL WARNING AND CLIMATOLOGY DATA

	1969	1970	1971	1972	1973
TOTAL NUMBER OF WARNINGS	0	27	19	76	43
CALENDAR DAYS OF WARNING	0	8	8	21	13
TROPICAL DEPRESSIONS	0	1	1	0	1
TROPICAL STORMS	0	1	1	3	0
HURRICANES	0	1	1	1	1
TOTAL	0	3	3	4	2

#### 2. INDIVIDUAL CASES<sup>1</sup>

Two tropical cyclones entered the Central Pacific from the east during 1973. Both Doreen and Katherine were fully developed hurricanes in the Eastern North Pacific before crossing 140°W longitude. Only Doreen was still of hurricane intensity upon entering the Central North Pacific.

Doreen, the first hurricane of the year to invade the Central North Pacific, was first located on 16 July by weather satellite near 10°N 101°W over the warm waters off Panama. Throughout her life cycle, Doreen followed a path strikingly similar to that of Hurricane Celeste of August 1972.

The small storm rapidly intensified to hurricane strength as she moved westnorthwestward toward Hawaii. On the ninth day after detection, about 800 miles southeast of Hawaii, Doreen weakened to a tropical storm, turned to the southwest, and decelerated.

On the afternoon of the 27th, the 144-foot Greek ship, CORNELIA, sailed into the storm's path and sent out an emergency call for help when it lost its rudder while being lashed by 50 kt winds and 35-foot waves. A sea level pressure of 971mb was

reported. The ship managed to clear the storm and continued to Panama after deciding not to return to Honolulu with Coast Guard assistance.

After the slowdown, Doreen accelerated toward the westnorthwest attaining 85kt winds near her center. She passed 300 miles southsouthwest of South Point, Hawaii on the afternoon of the 30th.

On the afternoon of the 29th, nine-foot ocean swells and three and a half foot surf generated by Doreen were observed at Kapoho, the easternmost town on the island of Hawaii.

On the afternoon of 1 August, a weak Doreen passed 100 miles north of Johnston Island. Doreen dissipated under an upper trough two days later as she crossed the International Date Line. No damage was incurred at Hawaii or Johnston Island.

Beginning as a weak cloud circulation seen by weather satellite on 28 September, Katherine, the second and last Central North Pacific storm of 1973, developed over the warm waters off Panama in the same area as Doreen. However, Katherine did not follow the same path. She moved towards the northwest, intensifying to hurricane strength on 1 October, but then curved to the southwest between 120 and 125°E longitude.

Weakening to tropical storm strength, Katherine turned to the southwest on the 3rd. By the 6th, she began to follow a more westerly course near 13°N 130°W, dissipating a few days later 600 miles eastsoutheast of the island of Hawaii under a cold upper trough.

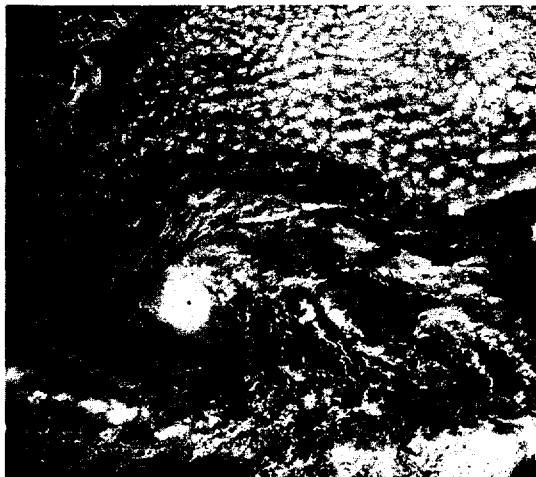
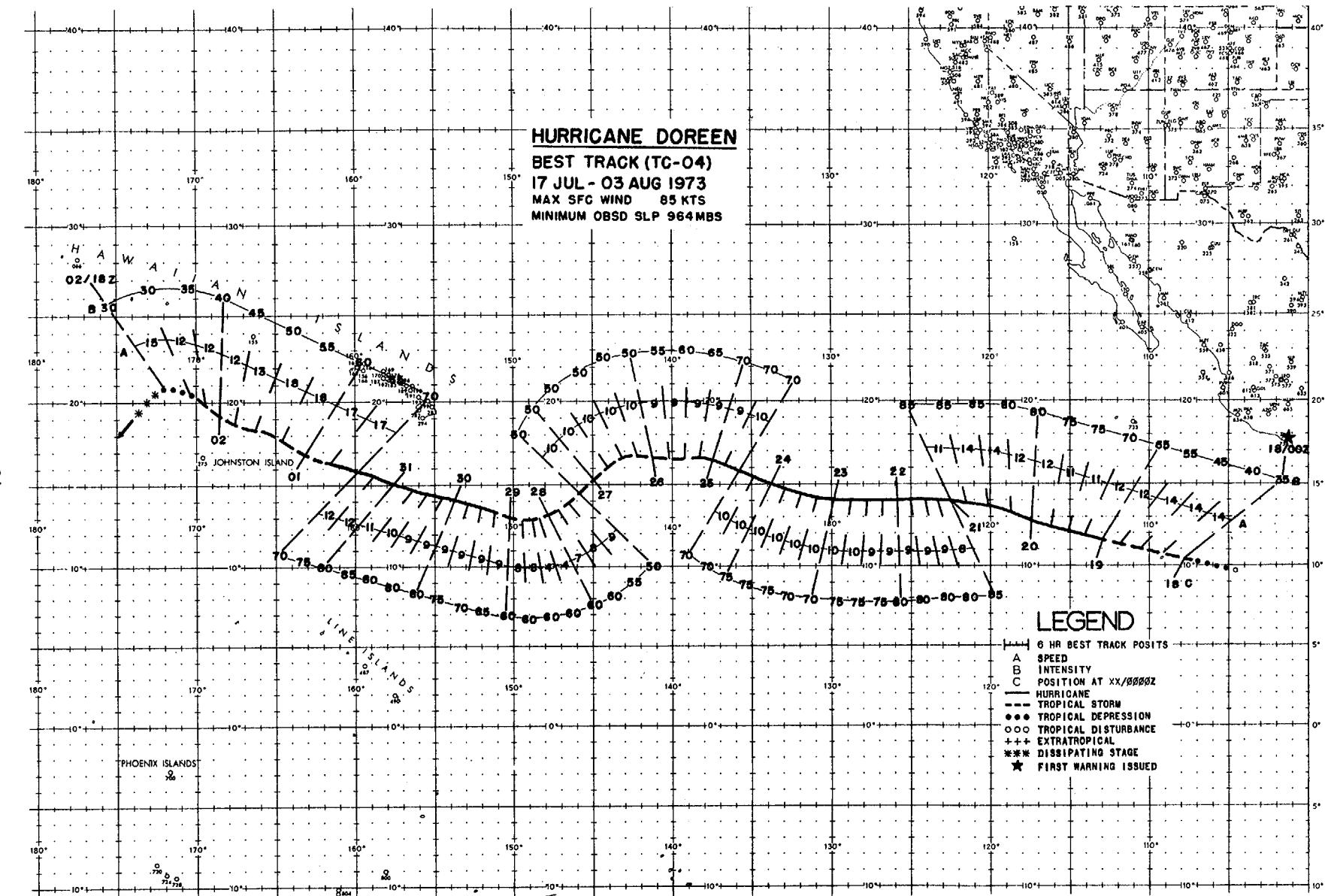
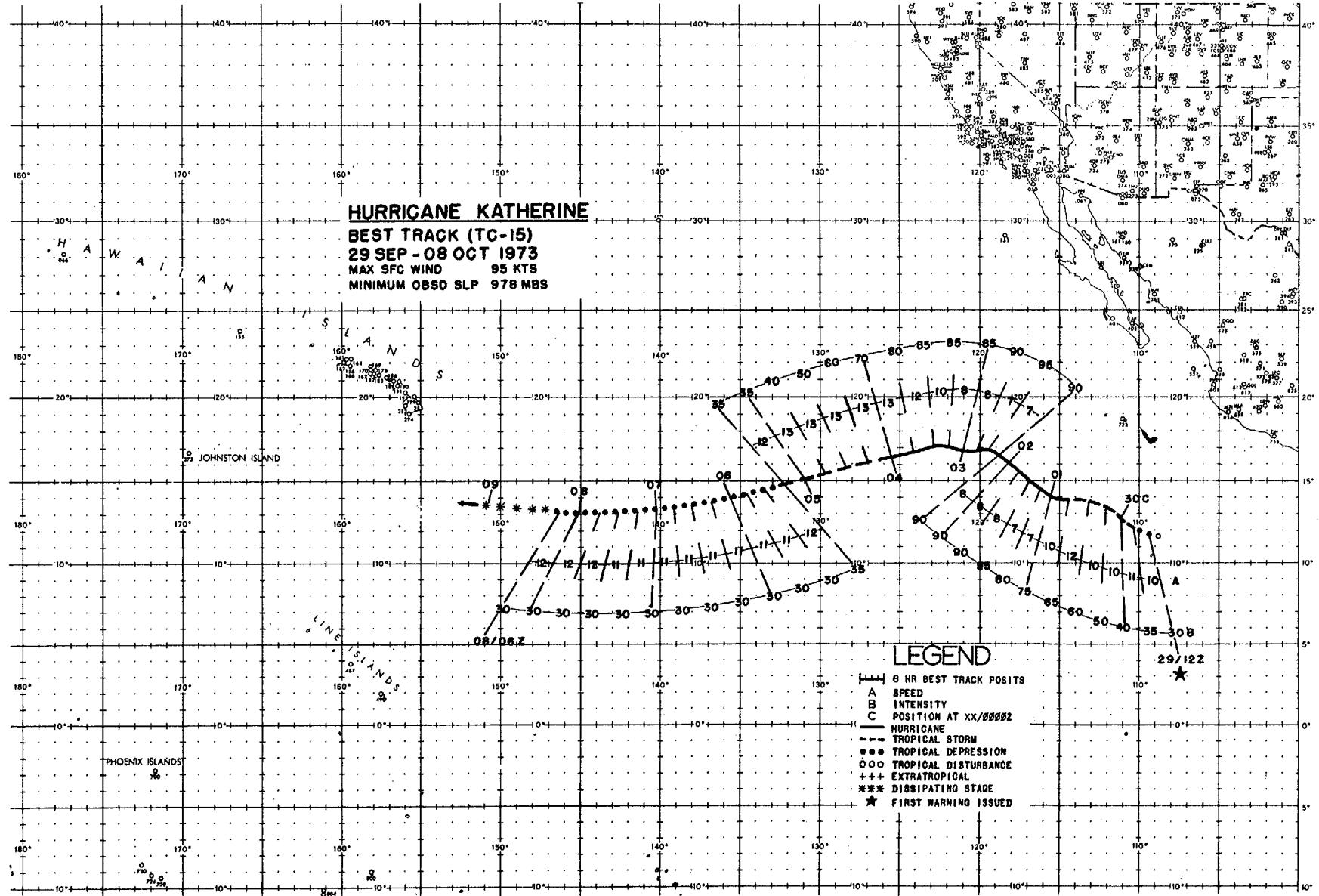


FIGURE A-1. Tropical Storm Doreen, 28 July 1973, 2149 GMT. (DMSP imagery)

<sup>1</sup>Report submitted by Meteorologist in Charge, NWS Forecast Office, Honolulu, Hawaii.





4. CENTER FIX DATA - HURRICANES

HURRICANE DOREEN  
Fix Positions For Cyclone No 4  
0600Z 18 JUL TO 1000Z 03 AUG

FIX NO.	TIME	POSIT	MAX OBS	MAX OBS	OBS	MIN	MIN	FLT	EYE	ORIEN-	EYE	POSIT	MSN NMHR
			CAT NAV-MET	FLT LVL WIND	SFC WIND	SLP	700MB	LVL	HTG	TI/TO	FORM	TATION	
1	171659Z	10.4N 125.0E	SAT		NON DAPP								
2	181653Z	11.2N 116.5E	SAT		NON DAPP								
3	201373Z	10.4N 121.5E	SAT	P 10 5 700 90 102 340	10 120 360 30	972	285 15 8	CIRC					1
4	201653Z	10.4N 122.5E	SAT	P 15 5 700 10 95 330	10 120 360 45	968	283 17 7	CIRC					2
5	210004Z	10.3N 125.5E	SAT	P 5 5 700 50 90 310	10 80 310 818	968	281 16 9	ELIP	SE-NW	15x 5			3
6	211904Z	10.4N 125.5E	SAT		NON DAPP								
7	221412Z	14.4N 125.5E	SAT		NON DAPP								
8	231636Z	14.4N 133.8E	SAT	(14.5/4.5 / 00.5/25HRS)	PCN 1 DAPP								
9	241737Z	15.7N 135.5E	SAT		NON DAPP								
10	231606Z	14.4N 131.8E	SAT		NON DAPP								
11	231636Z	14.4N 133.8E	SAT		NON DAPP								
12	241737Z	15.7N 135.5E	SAT		NON DAPP								
13	241737Z	15.7N 135.5E	SAT		NON DAPP								
14	242106Z	15.4N 137.0E	SAT	(14.5/4.5 / / HRS)	PCN 1 DAPP								
15	250930Z	16.7N 134.9E	SAT	(13.5/4.5 / 01.0/25HRS)	PCN 1 DAPP								
16	251030Z	16.4N 140.2E	SAT	(13.5/4.5 / 01.0/25HRS)	PCN 1 DAPP								
17	251830Z	16.4N 140.2E	SAT	(13.5/4.5 / 01.0/25HRS)	NON DAPP								
18	260253Z	16.4N 143.2E	SAT		PCN 1 DAPP								
19	260253Z	16.4N 143.2E	SAT		NON DAPP								
20	262104Z	15.4N 144.8E	SAT	(13.5/3.5 / 01.0/24HRS)	PCN 1 DAPP								
21	271637Z	14.2N 146.5E	SAT	(14.0/4.0 / 00.5/23HRS)	PCN 1 DAPP								
22	281730Z	13.8N 139.5E	SAT	(14.0/4.0 / 00.5/25HRS)	NON DAPP								
23	281730Z	13.8N 139.5E	SAT	P 5 (14.0/4.0 / 00.5/25HRS)	12 80 350 240	8 967	280 10 10	CIRC					4
24	291830Z	13.7N 152.4E	SAT	P 10 (14.0/4.0 / 00.5/25HRS)	NON DAPP								
25	301830Z	14.0N 152.4E	SAT	P 10 (14.0/4.0 / 00.5/25HRS)	NON DAPP								
26	301930Z	14.0N 152.4E	SAT	P 10 (14.0/4.0 / 00.5/25HRS)	NON DAPP								
27	301930Z	14.0N 152.4E	SAT	(14.0/4.0 / 00.5/25HRS)	NON DAPP								
28	302000Z	15.0N 157.4E	SAT	(14.5/5.5 / 01.0/24HRS)	PCN 1 DAPP								
29	311210Z	15.4N 160.4E	SAT		PCN 1 DAPP								
30	312045Z	16.4N 162.4E	SAT	P 10 5 70n 180 70 90	4 65 90	6 994	301 16 9	CIRC					
31	012106Z	16.4N 164.4E	SAT	(12.0/3.0 / 01.0/24HRS)	NON DAPP								
32	021062Z	16.0N 164.4E	SAT	(12.0/3.0 / 01.0/24HRS)	NON DAPP								
33	021939Z	20.3N 172.4E	SAT	(12.0/2.0 / 00.5/23HRS)	NON DAPP								

HURRICANE KATHERINE  
Fix Positions For Cyclone No 15  
0600Z 30 SEP TO 1000Z 08 OCT

FIX NO.	TIME	POSIT	MAX OBS	MAX OBS	OBS	MIN	MIN	FLT	EYE	ORIEN-	EYE	POSIT	MSN NMHR
			CAT NAV-MET	FLT LVL WIND	SFC WIND	SLP	700MB	LVL	HTG	TI/TO	FORM	TATION	
1	291559Z	12.0N 110.2E	SAT		NON DAPP								
2	300843Z	13.0N 113.0E	SAT		PCN 1 DAPP								
3	301953Z	13.0N 115.4E	SAT	P 5 (14.5/4.5 / 00.5/ HRS)	PCN 1 DAPP								
4	301953Z	14.0N 115.4E	SAT	(14.5/4.5 / 00.5/ HRS)	PCN 1 DAPP								
5	301948Z	14.1N 114.4E	SAT	P 5 (14.5/4.5 / 00.5/ HRS)	40 40 330 20	978	290 14 12	CIRC					
6	011753Z	15.0N 117.2E	SAT		PCN 1 DAPP								
7	022103Z	16.0N 120.4E	SAT	(15.0/5.5 / / HRS)	PCN 1 DAPP								
8	022103Z	16.0N 120.4E	SAT	(15.0/5.5 / / HRS)	PCN 1 DAPP								
9	022103Z	16.0N 120.4E	SAT	(15.0/5.5 / / HRS)	PCN 1 DAPP								
10	022403Z	16.0N 120.5E	SAT	(15.0/5.0 / 0.5/ HRS)	PCN 1 DAPP								
11	031103Z	16.0N 120.0E	SAT		NON DAPP								
12	031137Z	16.0N 124.4E	SAT		NON DAPP								
13	051730Z	14.1N 134.5E	SAT	(12.0/2.5 / 00.5/24HRS)	NON DAPP								
14	080605Z	13.0N 146.4E	SAT	(12.0/2.0 / 00.5/22HRS)	PCN 1 DAPP								
15	082259Z	13.0N 150.4E	SAT	(11.5/2.0 / 00.5/23HRS)	PCN 1 DAPP								



HURRICANE KATHERINE

1200Z 29 SEP TU 1800Z 8 OCT

BEST TRACK			WARNING			24 HOUR FORECAST			48 HOUR FORECAST			72 HOUR FORECAST			
POSIT	WIND	POSIT	WIND	ERRNU	DST WIND	POSIT	WIND	ERRNU	DST	WIND	POSIT	WIND	ERRNU	DST	WIND
291200Z 11.8N 109.5W	30 11.8N 110.0W	30	13.4N 113.6W	30	33 -30	17.4N 114.0W	60	150 -30	21.2N 116.3W	50	343 -40				
291800Z 12.1N 110.2W	35 11.8N 110.6W	40	29 5 14.0N 113.9W	60	47 -5	17.4N 114.0W	60	150 -30	21.2N 116.3W	60	453 -26				
300600Z 12.8N 111.3W	40 12.1N 111.2W	45	42 5 15.0N 115.0W	65	61 -10	19.4N 114.5W	60	220 -30	23.0N 116.3W	60	453 -26				
301200Z 13.3N 113.2W	50 13.1N 113.0W	50	17 -10 18.0N 115.2W	60	70 129 -28	19.0N 115.0W	55	373 -40	23.7N 115.3W	50	841 -35				
301800Z 13.9N 114.7W	65 13.9N 114.8W	60	6 -5 15.3N 119.5W	55	104 -35	16.5N 124.2W	50	230 -40	16.8N 129.3W	45	292 -35				
010000Z 14.7N 115.5W	75 14.3N 116.3W	50	31 -10 15.5N 120.7W	75	148 -15	16.3N 125.0W	70	259 -15	16.8N 128.5W	65	775 -5				
010600Z 15.0N 119.9W	85 15.3N 119.3W	70	28 -10 17.1N 123.2W	70	208 -10	18.5N 127.3W	95	231 -25	24.0N 129.3W	80	826 -25				
011200Z 15.3N 119.7W	85 15.3N 119.3W	70	28 -10 17.1N 123.2W	70	208 -10	18.5N 127.3W	95	231 -25	24.0N 129.3W	80	826 -25				
020000Z 16.1N 118.2W	90 16.0N 118.0W	85	13 -5 18.5N 120.0W	75	114 -10	21.5N 121.5W	60	386 -10	25.0N 122.0W	40	777 -5				
020600Z 16.5N 118.9W	95 16.0N 118.8W	85	25 -10 18.0N 122.5W	80	69 -5	19.5N 124.0W	65	200 -25	20.5N 129.5W	45	354 -10				
021200Z 16.8N 120.2W	90 16.5N 120.3W	85	19 -5 18.0N 123.0W	75	99 -5	19.3N 126.7W	80	330 -40	21.0N 129.0W	50	519 -20				
030000Z 16.9N 121.1W	95 17.1N 120.9W	80	17 -5 18.5N 124.0W	55	158 -15	20.0N 127.0W	40	371 -5	21.0N 130.5W	30	516 -0				
030600Z 17.0N 121.9W	85 17.3N 121.5W	75	29 -10 18.0N 124.7W	50	207 -10	20.3N 126.0W	40	406 -25	21.5N 131.5W	30	553 -0				
031200Z 17.0N 122.4W	85 17.7N 122.4W	75	29 -10 18.0N 125.4W	55	261 -5	19.0N 124.7W	45	424 -15	20.0N 132.0W	30	518 -0				
031800Z 16.8N 124.2W	80 16.0N 124.7W	65	29 -15 15.9N 129.1W	55	50 15	15.2N 131.5W	50	63 -20	14.0N 138.0W	45	96 -15				
040000Z 16.4N 125.7W	70 16.0N 125.7W	65	13 -5 15.7N 130.0W	55	68 20	15.0N 135.0W	50	76 -20	14.0N 142.0W	45	86 -15				
040600Z 16.2N 127.0W	80 16.0N 127.0W	60	13 -5 15.5N 132.0W	45	48 10	14.2N 138.0W	40	72 -10	14.0N 142.0W	45	83 -10				
041200Z 15.7N 128.4W	50 16.4N 128.2W	55	27 -5 15.2N 133.0W	40	48 10	14.2N 138.0W	30	47 -5	15.0N 143.2W	55	23 -5				
041800Z 15.0N 129.8W	55 15.7N 129.7W	55	19 15 15.0N 135.5W	40	75 10	17.0N 141.0W	35	241 -5	15.0N 146.0W	35	429 -5				
050000Z 15.1N 131.0W	35 15.7N 129.9W	50	73 15 15.0N 137.0W	40	92 10	17.5N 142.0W	35	269 -5	20.5N 147.0W	30	455 -0				
050600Z 14.8N 132.2W	35 15.2N 132.0W	50	27 15 15.0N 137.5W	45	89 10	17.0N 142.0W	40	229 -10	19.0N 146.0W	35	347 -5				
051200Z 14.4N 133.4W	30 15.3N 132.2W	50	88 20 14.9N 138.0W	45	93 15	15.5N 143.0W	40	145 -10	18.0N 147.7W	35	281 -10				
051800Z 14.2N 134.5W	30 14.2N 134.5W	50	0 20 13.0N 138.3W	40	52 10	12.0N 142.0W	40	119 -10	15.4N 162.3W	35	767 -10				
060000Z 14.0N 135.8W	30 14.1N 135.6W	45	13 15 12.5N 141.0W	35	63 5	12.0N 146.0W	30	64 0	---	---	---	---	---	---	
060600Z 13.8N 136.9W	30 14.0N 136.7W	40	27 10 15.0N 142.5W	25	75 -5	17.0N 146.0W	25	231 -5	22.0N 147.0W	25	22 -5				
061200Z 13.5N 136.7W	30 14.0N 136.7W	40	27 10 15.0N 142.5W	30	155 -5	17.0N 146.0W	25	231 -5	22.0N 147.0W	25	22 -5				
061800Z 13.4N 139.1W	30 13.0N 139.8W	50	47 20 12.5N 143.8W	50	36 20	11.0N 147.0W	50	130 -25	---	---	---	---	---	---	
070000Z 13.3N 140.3W	30 12.5N 142.0W	45	51 20 12.5N 147.0W	40	113 -20	12.0N 148.5W	50	158 -20	12.0N 148.5W	50	158 -20				
070600Z 13.2N 141.4W	30 12.9N 144.1W	35	17 5 13.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10				
071200Z 13.1N 143.9W	30 12.9N 144.1W	35	17 5 13.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10				
080000Z 13.1N 145.1W	30 13.3N 146.3W	35	71 5 13.8N 148.2W	35	43 10	12.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10				
080600Z 13.2N 146.3W	30 13.4N 146.8W	35	31 5 13.8N 148.2W	35	63 10	12.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10				
081200Z 13.3N 147.9W	25 13.6N 148.2W	35	29 10 14.0N 150.0W	35	63 10	12.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10				
081800Z 13.4N 149.2W	25 13.5N 148.0W	30	70 5 13.8N 150.0W	35	63 10	12.0N 148.2W	35	63 10	12.0N 148.2W	35	63 10				

HURRICANES WHILE WIND OVR 35KTS

AVERAGE FORECAST ERROR: 30NM 164NM 276NM 442NM  
 AVERAGE RIGHT ANGLE ERROR: 18NM 16NM 17NM 326NM  
 AVERAGE DIAS OF WIND ERROR: 5KTS 14KTS 14KTS 320KTS  
 NUMBER OF FORECASTS: 23 20 15 11

ALL FORECASTS  
 WARNING 24-HR 48-HR 72-HR  
 35NM 62NM 222NM 405NM  
 18NM 62NM 15NM 308NM  
 10KTS 13KTS 13KTS 13KTS  
 3KTS 1-KTS 1-KTS 0KTS  
 38 34 29 25